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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Bodo Furchheim

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EXAMINER

DIAZ, THOMAS C

ART UNIT

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 09/674,648	Applicant(s) FURCHHEIM ET AL.	
	Examiner THOMAS DIAZ	Art Unit 3656	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 January 2012.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 3-5 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-5 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 October 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date. _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 01/09/2012 has been entered.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1, 3-5 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites "placing bearer rings, produced in a separate method and in correspondence with prospective locations of cam regions on said cam shaft, in a high internal pressure forming tool together with the tube to be formed, whereby the bearer rings are attached by expansion of the tube in a frictional and interlocking manner, each of the bearer rings having an outer surface and an inner surface, and wherein the bearer rings possess the same wall thickness;

closing the forming tool axially, subjecting the tube to a predetermined axial force and a medium under high internal pressure so that the tube expands to form said cam

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regions, wherein the diameter of the tube in said cam region are greater than the diameter of the tube at the non cam regions; and

in a first method step prior to said high internal pressure forming, regions of the tube which are clear of the regions in which the cams are seated are so kneaded and/or upset such that said tube regions which are clear of the cam regions are increased in thickness and/or are stretched so that bearing faces, drive and/or control elements are formed from the tube itself, whereby the shaft has all cams in form and in position on a single piece” on lines 4+. It is unclear in what order the various processes or steps are occurring. For example, the last indented recitation of the claim recites "in a first method step prior to said high internal pressure forming". However, there are at least two steps which apparently occur before the internal pressure forming, being the step of closing of the forming tool and the step of placing of the bearing rings on the cam shaft along with placing both inside the forming tool. As a result, when does the step of kneading and/or upsetting recited in the last recitation occur? Does it occur before placing of the bearing rings on the shaft or after that which appears implied by the use of the phrase “first method step”, or does it occur after closing of the forming tool?

In general the claim is confusing since it does not sequentially set forth the order of steps. Perhaps clearly reciting the steps in order from start to finish would clarify the issue. In addition, the recitation on lines 6-7 reciting “whereby the bearing rings are attached by expansion of the tube in a frictional and interlocking manner” should be located in part of the claim following the step of applying the internal pressure.

Claim 3 recites "that between the cam shaft ends in a step prior to internal high pressure forming bearing faces and the eventual region where the cams are to be seated, are produced by round kneading and by reducing the diameter in this part to the desired size". This claim has numerous issues. Grammatically, there appears to be a comma missing after "shaft ends" and after "pressure forming". It is unclear as to when this step actually occurs. Does it occur at the same time as the "first method step" of claim 1? Also, are the bearing faces mentioned here the same as the ones in claim 1 or entirely different bearing faces? If they are the same then it should be written as "said bearing faces".

Claim 4 also recites "bearing faces". Are these the same as the ones mentioned in claim 1 or different ones? If they are different, then perhaps applicant should designate first and second sets of bearing faces.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 3, 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki (USP 4660269) in view of Jordan (USP 4382390).

Suzuki discloses a method for the manufacture of a camshaft from a tube (2), the camshaft having bearing rings (3) attached thereto, the method comprising the following steps; placing bearing rings, produced in a separate method and in correspondence with

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prospective locations of hollow cams on the cam shaft (see fig.4), in a high internal pressure forming tool (see fig.4) together with the tube to be formed, whereby the bearer rings are attached by expansion of the tube in a frictional and interlocking manner (fig.1, tube is hydraulically expanded with fluid pressure), each of the bearer rings having outer surface and an inner surface (see fig.4), closing the forming tool axially (see fig.4; the forming tool is closed axially) subjecting the tube to predetermined axial force (during the initial step shown in fig.4, the tube is subjected to an axial force) and a medium under high internal pressure (as described in col.2, lines 28-39; a high internal pressure expands the tube to as to form the cam regions) so that the tube expands to form said cam regions; in a first method step prior to the high internal pressure forming, regions of the tube which are clear of the regions in which the cams are seated are kneaded or upset such that said tube regions which are clear of the cam regions are increased in thickness and/or stretched so that bearing faces, drive and/or control elements are formed from the tube itself (as described in col.2, lines 28-39; prior to the internal pressure, the tube is swaged or kneaded so as create bearing faces for the end caps), whereby the shaft has all cams in form and in position on a single piece (see fig.1; everything is assembled to form a single piece).

Suzuki fails to explicitly disclose wherein the bearer rings possess the same wall thickness; wherein the diameter of the tube in said region are greater than the diameter of the tube at the non cam regions.

Jordan teaches the concept of using bearing rings which possess the same wall thickness (seen in fig.2); and wherein the diameter of the tube in said region are greater than the diameter of the tube at the non cam regions (see figures).

It would have been obvious to one having ordinary skill in the art at the time of the invention to have modified the bearing rings disclosed by Suzuki to possess the same wall thickness and configure the tube such that the diameter of the tube in the region of the bearing rings is greater than the other non cam regions in order to provide the predictable result of assuring good support of the bearing rings on the cam shaft since the cam shaft would be forced to expand into the area of the bearing ring thereby creating a better frictional and interlocking fit.

Regarding claim 3, Suzuki discloses that between the cam shaft ends in a step prior to internal high pressure forming bearing faces and the eventual region where the cams are to be seated, are produced by round kneading and by reducing the diameter in this part to the desired size (as described in col.2, lines 28-39; prior to the internal pressure, the tube is swaged or kneaded so as create bearing faces for the end caps and the regions where the cams are to be seated; further at least a portion of these areas would have a reduced diameter).

Regarding claim 4, Suzuki discloses characterized in that bearing faces are produced between the cams by internal high pressure forming by expanding the tube (see fig.1; the final shape of the areas between the cams would be determined during the step of high pressure forming).

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki (USP 4660269) in view of Jordan (USP 4382390), as applied to claim 1 above, and further in view of Swars (GB 2215646).

Regarding claim 5, Suzuki fails to explicitly disclose the bearer rings are hardened in a known manner prior to being placed in the internal high pressure forming tool.

Swars teaches the concept of hardening the bearer rings or cams in a known manner prior to being placed on the cam shaft (abstract).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the bearing rings disclosed by Suzuki so as to be hardened prior to being placed in the internal high pressure forming tool, as taught or suggested by Swars, in order to provide the predictable result of providing a stronger bearing ring so as to withstand the pressures during expansion of the tube. In addition, since the bearing ring is produced separately it would have been easier to perform the hardening prior to assembly on the camshaft rather than after.

Response to Arguments

Applicant's arguments with respect to claims 1, 3-5 have been considered but are moot because the arguments do not apply to any of the references being used in the current rejection.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Please note Swars (5868042) which also shows different

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functional elements 7 and 10 formed from the shaft itself. USP 2892254, 4693138, 5868042 all discuss the use of hydraulic expansion through the use of hydraulic fluid. Harle (USP 5024294) discloses the concept of performing the tube with forging (upsetting) and round kneading in camshafts.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to THOMAS DIAZ whose telephone number is (571)270-5461. The examiner can normally be reached on Monday-Friday 9:00am to 5:30pm..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Ridley can be reached on (571)272-6917. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Thomas Diaz/
Examiner, Art Unit 3656